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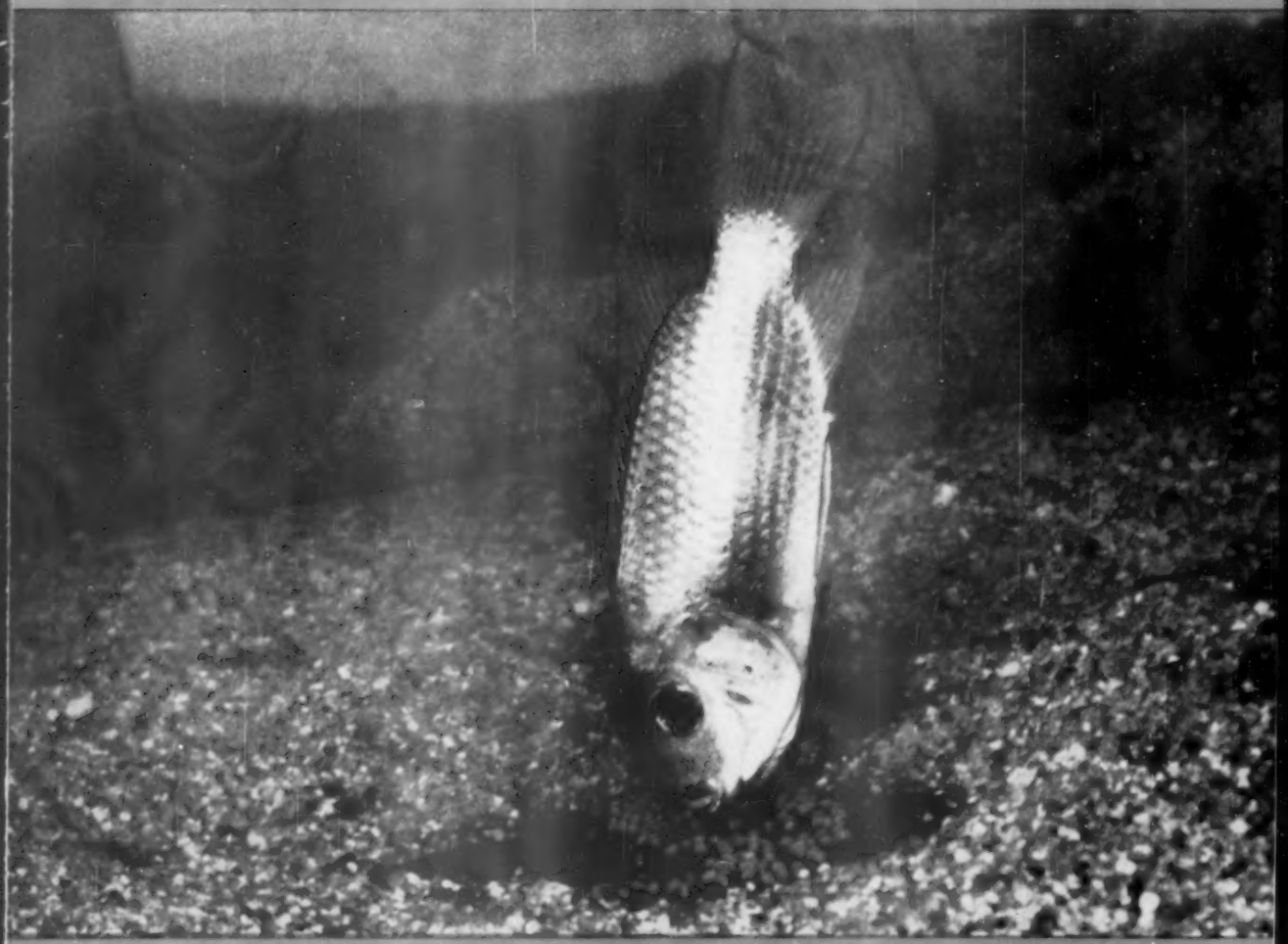
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Mouthbreeder Fish

See Page 242

A SCIENCE SERVICE PUBLICATION

BIOCHEMISTRY

Misshapen Molecules

Since body builds the wrong kind of molecules on occasion, thus causing many unconquered diseases, including cancer, scientists are seeking the reasons for abnormal cells.

► CAUSES OF unconquered diseases, including cancer, are being sought in misshapen molecules in the human body.

This new direction for research is being undertaken because diseases not caused by infections, but occurring because the body builds the wrong kind of molecules into the blood cells, have within the past five years become the most thoroughly understood illnesses.

These are the sickle cell anemias first recognized in 1911. The cause of this type of anemia was found in 1949 by research workers associated with Dr. Linus Pauling at California Institute of Technology, who explained this research during the American Chemical Society meeting in Kansas City, Mo.

Abnormal blood cells are to blame. The red coloring matter forms long strings that stick together and twist the red blood cells into the shape of a sickle blade. The condition is inherited and occurs almost exclusively in Negroes.

So long as only half the red cells are abnormal, the individual is not sick, but is a carrier of the dangerous hereditary trait. Anemia appears among children when both parents are such carriers.

Theoretically, one-fourth of such children are free from the condition. However, half are carriers and the remaining fourth will die because their blood cannot carry enough oxygen to keep their body processes going for a normal lifetime.

The blood cells are normal in everything but hemoglobin, which is responsible for the twisted stringy structure. This makes the cell membranes sticky and the blood sludgy so that it will not flow through the capillaries. Organs are damaged by lack of the oxygen that the blood should bring and does not. Infections set in which the body cannot fight successfully.

The condition is described as an inborn error of hemoglobin synthesis by Dr. Pauling and his associates, Dr. Harvey A. Itano, senior research fellow at California Institute of Technology, Drs. Phillip Sturgeon and William R. Bergren of department of research, Childrens Hospital, Los Angeles, and University of Southern California School of Medicine.

This group has identified three additional types of hemoglobin abnormalities, the newest represented by one patient whose case was described to this meeting of the American Chemical Society by Dr. Itano. (See SNL, April 3, p. 223.)

With normal hemoglobin and four abnormal kinds, there are 15 possible combinations, since an individual can be a carrier of more than one type of abnormality. Nine of the 15 have been identified in patients. Some of the three newer types of blood cell abnormality have been found in members of the white race.

The only treatment which helps these sufferers consists of transfusions of normal blood, and this help lasts only three weeks. By that time, the transfused cells are worn out and the imperfect cells of the patient's own manufacture are making trouble again. Removal of the patient's spleen can be of some help, because the spleen is the organ that destroys damaged blood cells and, in this disease, the spleen becomes enlarged and both makes and takes out damaged cells too fast.

The California researchers are hoping to find some drug that will have the same effect as supplying more oxygen to the tissues. However, whether or not a cure is found, recognition of the possibility that other diseases, which do not yield to known kinds of treatment, may be due to other abnormalities is important.

Some cancers, Dr. Pauling said, will be studied to see whether any factors like those of sickle cell anemia can be recognized. There is, also, the chance that an abnormality, if found, may not be inborn but may result from reaction between body cells and some chemical in the environment.

In the early days of rubber manufacture, aniline was used in vulcanization and workers died because aniline changed the oxidation state of the iron in the hemoglobin of their blood. Some such reaction might occur due to certain molecular structures in tobacco smoke or in agricultural chemicals. If it occurred, it might affect any of the one hundred thousand different kinds of protein molecules in the human body.

In the case of sickle cell anemia, the scientists had discovered all about the disease only two years after they started looking for abnormal molecules as the possible cause.

Science News Letter, April 17, 1954

ICHTHYOLOGY

For Mouthbreeders, Males Carry the Eggs

See Front Cover

► FOR NINE to 30 days the male mouthbreeder fish carries eggs in his mouth, without a bite to eat for himself, until the eggs are old enough to be ejected.

The mouthbreeder, *Tilapia macrocephala*, protects his offspring from predatory fishes and bacteria by churning them around and around in his throat pouch.

The whole mouthbreeding process of these unusual fishes went on display at a live exhibit, with photographs, at the American Museum of Natural History, New York.

Included are numerous live eggs, embryos, fishes, including males with eggs in their mouths, and a series of dishes containing eggs and embryos in various stages of development, ranging from newly laid eggs to embryos still attached to the yolk sacs from which they gain their first nourishment.

"Generally 40 to 120 eggs are carried in the mouth of the male," explained Dr. Lester R. Aronson, chairman of the department of animal behavior of the Museum. Dr. Aronson has recently returned from a year of Fulbright study in Nigeria, where he studied the calcium and protein-rich mouthbreeding fish in its natural West African environment.

This type of fish builds its nest exclusively by the mouth, he reported, in contrast to other fish who usually use their tails or bodies. The female does most of this work, while the male slaps at her body with his tail in a ritual of love-making.

"Courtship and nest building go on for several days before spawning," Dr. Aronson explained. Then the female lays her eggs, the male passes over them to fertilize them, and in a matter of a few minutes the eggs are picked up by the male, as shown on the cover of this week's SCIENCE NEWS LETTER. The male then begins the incubation period.

When the young have grown to one-quarter to one-half inch long, the father spits them out. In this species, the young fry, once released, never return to the parental mouth. In some related species, however, the young swim back to the mouth when disturbed.

One of the exhibits shows a batch of live eggs, placed in a test tube and churned constantly by a jet of water. The eggs remained alive. However, eggs that are placed in a dish where the water is stationary die in a day or two.

Fully mature fish measure from two to eight inches in length. Males have a golden yellow gill cover, whereas the female gill cover usually has a deep red spot near the center.

Found in brackish and freshwater ponds and creeks, they are an extremely hardy fish and are economically one of the most important inland fishes along the coastal region from Senegal to the Belgian Congo. Valued by Africans for their excellent food qualities, they are broiled or fried, sometimes dried and smoked.

In the small ones, much of the bone can be eaten—an important source of calcium in many regions where this mineral might otherwise be deficient in the local diet. Government fisheries officers in Nigeria have recently begun to show an interest in the study of this *Tilapia* and related species for stocking reservoirs, ponds and swamp rice fields and also for fish farming.

Science News Letter, April 17, 1954

PHYSICS

Probe Fusion Elements

Predict many more H-bomb blasts will be detonated to test the fusion of different combinations of light elements, with the conversion of mass into energy.

By WATSON DAVIS

➤ MANY MORE H-bomb explosions will occur in the Pacific in coming months.

Aside from any military or political reasons, we must know about the phenomenon of fusion, the transmutation of light elements, with release of atomic energy, the conversion of mass into energy. This requires scientific experimentation.

What is being done on a grand scale is comparable historically to the exploration of radioactivity that took place about the turn of the century, or the development of uranium fission and the whole A-bomb program at the beginning of World War II.

There is not just one kind of superbomb — whether you call it hydrogen bomb, thermonuclear weapon, or fusion bomb. There probably are a dozen or so, each materially different. Then there is always the question as to how small and how large each of them may be made. And how they can be made to explode most efficiently.

The essential ingredients in a fusion bomb are: 1. Light chemical elements, part of whose mass is converted into energy. 2. A detonating or igniting charge, which is presumably a plutonium fission A-bomb, which is no small explosion in itself.

The igniting A-bomb would provide the high temperatures of a million degrees or more that are needed to fuse the hydrogen or other elements so that they transform into other elements with conversion of a small amount of their mass into energy.

Probably an A-bomb is the only practical way now known of setting off an H-bomb. But some of the tests now under way may include an attempt to ignite an H-bomb with another source of very high temperature, a fine metallic wire exploded by a jolt of high voltage electricity.

The material in a fusion superbomb is basically some sort of hydrogen, either the double-weight deuterium or the triple-weight tritium. This is the chemical stuff, the lightest element. Theoretically it could be converted into the next heaviest element, helium, with a large yield of energy from the mass or matter lost in the process. This is the kind of reaction that is believed to keep the stars stoked. It happens in the H-bomb in very short fractions of a second, and it has to happen before the atoms involved are flung far apart by the energy that such atomic interactions create.

The first of the U. S. H-bombs, whose explosion in November, 1952, is now being witnessed by the world in officially released motion pictures (see SNL, April 10, p. 227), was presumably primarily a rather simple hydrogen bomb. It probably utilized a D-D reaction, a combination of two atoms of deuterium or heavy hydrogen. It may have been a D-T reaction, in which a deuterium atom coalesced with an atom of tritium or triple-weight hydrogen. Both of these reactions, theoretically, should work.

Certainly one of them did in the now famous first H-bomb shot of 1952 Operation Ivy, which has become psychologically "poison ivy" to many.

The first H-bomb of 1954 (March 1) was about twice as large as the calculated estimate. It has aroused people by its tremendous size and the meteorological accident of "fall-out" of its radioactive material upon Japanese fishermen inside the danger area.

Too little is reported about the March 26 and April 6 bombs to do much speculating, but the March 1 bomb probably contained light element ingredients other than the hydrogens of the earlier H-bomb. That is what probably gave the March 1 bomb its extra "umph." It was an experiment. This test should have been made for scientific reasons, simply to know about the facts of matter and energy, even if it served no military or political purpose.

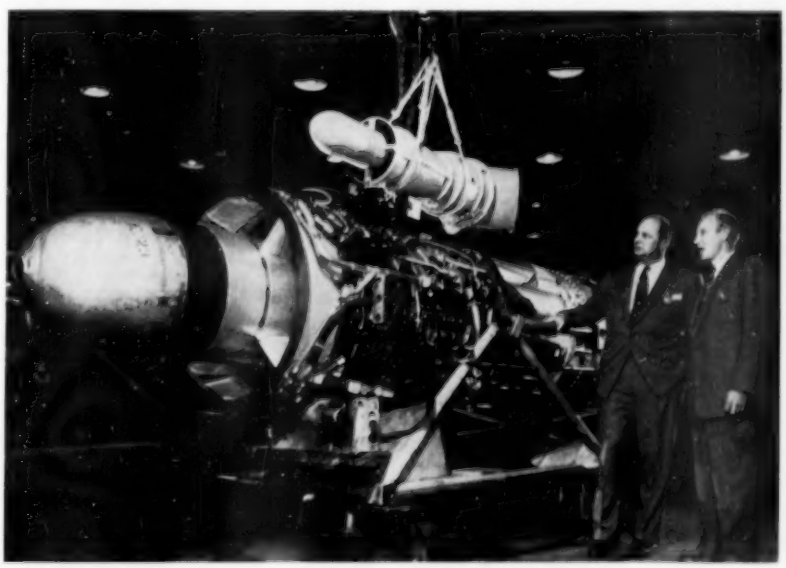
The best guess at an added light element is lithium. This is a light metal, atomic number 3 in the list of chemical elements. Lithium is relatively plentiful in the earth's crust, and it was used in its metallic form during the war to produce hydrogen for inflating weather and radio balloons.

Even before 1939 when the discovery of the fission of uranium made obvious the eventual building of an atomic bomb, the reactions between the light elements were known both by calculation and observation. In 1950 this reporter detailed such possibilities. (See SNL, Feb. 11, 1950, p. 83.)

For instance, there was a decrease in mass when an atom of lithium isotope 6 and an atom of deuterium or heavy hydrogen reacted. This is translatable into energy by Einstein's famous mass-energy equivalence, $E = mc^2$, or energy equals mass times the velocity of light squared. Similarly, it was known that there was energy in the lost mass of the coming together of the various hydrogens with the other sort of lithium (weight 7), beryllium, boron, and even carbon and nitrogen.

The lack was a means of getting them together so that they would react. That was not available until the A-bomb was achieved. The fission of the A-bomb brought the needed temperature that slammed the light elements together. That is the reason that the H-bomb has to have an A-bomb at its heart.

There are so many possible combinations of the light elements to try that we can expect many more H-bomb tests.



JET FOR HELICOPTERS—A mock-up model of the new gas turbine engine, XT-58, being developed for helicopters by General Electric is shown here, compared for size with a jet engine that powers the Sabre Jet interceptor.

Tritium, hydrogen of mass three, has been assumed to be a necessary ingredient of the H-bomb. In 1950, President Truman ordered full speed ahead on the H-bomb. At a cost of over a billion dollars, the Savannah River plant was built primarily for tritium manufacture. (Tritium is made by bombarding lithium with neutrons from uranium or plutonium fission in an atomic reactor.)

Tritium is a gas in its elemental form, and a radioactive gas at that, half of it disintegrating in about 11 years. A most inconvenient material to put in a bomb, it is highly unlikely that it is used as a gas.

A chemical combination of lithium and ordinary hydrogen, lithium hydride, is a relatively common and solid chemical. Anyone can buy it. Lithium tritide should be a very similar solid and would combine in easily handled form two of the most fusionable elements.

Lithium deuteride would be similar and very much cheaper. No uranium would be consumed if this compound were used because the one part of deuterium in about 5,000 of water is extractable. It might do just about as well in the H-bomb. Thus there may be H-bombs without tritium. If that is true, H-bombs are little more costly than plutonium bombs and all the bombs can be rebuilt to be in the megaton range.

These are the questions being answered by the tests in the Marshall Islands. We can only guess at their answers.

It is unfortunate that the chapters in scientific history being written in secret reports can not be known, for they would be fascinating reading. The price that is paid for military security is the foregoing of the fruits of the great international interplay of scientific facts broadcast freely throughout the scientific world. Out of such freedom of science the atomic age was born.

Science News Letter, April 17, 1954

GENERAL SCIENCE

Explosion of World?

➤ CAN THE world be exploded like a gigantic atomic bomb and turned into a flaming star-like object with all life extinguished? This question has worried the world ever since discussion of atomic energy began.

Despite the tremendous size of the hydrogen bomb already achieved and the possibilities of even larger explosions, there is no danger of setting off a chain reaction which would destroy life on the earth. The answer to this problem of the annihilation of the earth is "no," just as it has been in the past.

Perhaps we can do no better than to repeat what has been said before. On Jan. 30, 1939, at the time when the fission of uranium first became known, it was not only possible to predict definitely that there would be an atomic bomb, but to report at that time (see SNL, Feb. 11, 1939, p. 86):

"The physicists are anxious that there be no public alarm over the possibility of the world being blown to bits by their experiments. Writers and dramatists (H. G. Wells' scientific fantasies, the play "Wings Over Europe,' and J. B. Priestley's novel, 'Doomsday Men') have over-emphasized this idea. While they are proceeding with their experiments with proper caution, they feel that there is no real danger except perhaps in their own laboratories."

More recently, in 1950, just after President Truman authorized the construction of the hydrogen bomb, this problem was discussed in more detail (see SNL, March 4, 1950, p. 133):

"Not even a monster super-H-bomb, the most gigantic that can be visualized, would explode the atmosphere of the earth or the waters of the oceans, ending life on the earth as we know it.

"That is the best judgment of scientists, despite the alarming statements of a few physicists. The damage that a dozen or so H-bombs could do to big cities is quite alarming enough without calling upon a chain reaction in the atmosphere or the seas.

"There is energy (excess mass that turns into energy) when hydrogen, oxygen and nitrogen of the air and water are transmuted to other elements. That is clear and no scientist disputes this fact. But in the explosion of an H-bomb there is even less than in an A-bomb of the sort of radiation and other debris that would propagate a chain reaction, particularly in the light elements.

"In the H-bomb the process is more of a combination of the light-weight elements involved to make other elements with an incidental loss of mass or matter, which turns into energy. This is what is called fusion. In the uranium-plutonium atomic bomb it is a matter of these two very heavy elements splitting into other middle-weight elements, with a slight loss of mass that turns into energy. This is called fission.

"In fission of the A-bomb, neutrons in excess are let loose and this makes possible the extremely rapid chain reaction. Probably neutrons do not have such a key role in the so-called hydrogen bomb, which seems to be a matter of smacking together the atoms of the hydrogen isotypes, deuterium and tritium (double and triple weight hydrogen), one or the other or both.

"To set off a chain reaction in the atmosphere or in water, something to react with the oxygen and hydrogen of the water and the nitrogen and oxygen of the air would have to be produced in profusion. This does not seem to be provided by the H-bomb if guesses as to its nature are correct.

"Not only that, but if the triggers or inciting radiations were present, the atoms of the air and water are too far apart to be easily acted upon and transmuted in bulk as would be necessary for an 'end-of-the world' disaster.

"If there was believed to be any considerable risk to an atmospheric or oceanic chain explosion, it is very likely that even the Russians would think a long time before risking a test. We must assume that since they seem to want to have a communistic world, they will not risk anything that they believed would envelop the earth in flame."

Science News Letter, April 17, 1954

Theoretically, the longest possible time that a total *eclipse* of the sun can last is seven minutes and 40 seconds.

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MEDICINE

Patient Given Cancer

Heroic woman, hopelessly sick, allowed doctors to back-transplant her own previously removed cancer cells, which had been cultured in test tubes for several months.

➤ THE STORY of a patient who wanted so much to "be useful to humanity" that she let doctors graft living cancer cells under her skin was related at the meeting of the American College of Surgeons in Chicago.

The patient was herself hopelessly sick with widespread cancer. She first let the doctors, at Memorial Hospital, New York, operate several times to remove pieces of cancer tissue for culture in test tubes and in laboratory animals.

After the cancer cells had been growing for several months outside the patient's body, the crucial test was made to see whether the cells were still human cancer cells. Proof of this came when they were back-transplanted under the patient's skin. They grew actively and, when pieces of this new cancer were removed for microscopic examination, they were seen to be identical with the cancer cells removed for examination so long ago.

The story was told by Dr. C. P. Rhoads, director of Memorial's Sloan-Kettering Institute for Cancer Research, to show that control over cancer can be won through chemicals, just as control of tuberculosis and other diseases due to invading germs has been won through development of suitable chemicals.

To test new chemicals against TB, scientists first have tried the chemicals out on cultures of human TB germs growing in test tubes outside the human body. Now, thanks in part to the heroic patient of the report, scientists know that the cancer cells they cultivate outside the human body are really human cancer cells.

When they find drugs, such as the new 6-mercaptopurine and the still newer, still on trial, azaserine, that might stop cancer, they can try them on cancer cells cultured outside the body.

If the drugs work on these cultured cells, they are working to destroy human cancers, not merely mouse or rat cancers, and can with more confidence be given to patients.

Dr. Rhoads stressed, however, that although cancer can be considered a foreign invader of the body, it cannot be considered a virus in the usual sense of the word. In fact, he said, the "virus theory" of cancer has perhaps led "to more misunderstanding than any other single topic" in cancer research.

"If," he said, "one restricts the term 'virus' to an agent capable of affecting by contagion, one derived from the external environment, and capable of inducing a permanent immunity, no evidence indicates that cancer in man is due to a virus. The question of virus etiology then becomes an academic one.

"If one extends the term 'virus' to include components of cells allied to genes or similarly inheritable units of the cytoplasm (often termed plasmagenes), then one can easily develop a concept into which all the known observations will fit. The neoplastic (cancer) cell, by this concept, is a genetically modified unit.

"In some instances the gene or gene-like equipment has been modified by physical or chemical injury. In others this has occurred by the inclusion of new genes or similarly functioning units derived from other cells with different and neoplastic inheritable qualities.

"In either case our task is first to exploit existing leads to the chemical cure of cancer by the selective destruction of its component cells.

"Eventually we must define and eliminate the cause of the genic modification which produces these cells."

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• RADIO

Saturday, April 24, 1954, 3:15-3:30 p.m. EST

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Harold R. Wainerdi, medical director of the National Multiple Sclerosis Society, will discuss "The Mystery of Multiple Sclerosis."

PSYCHOLOGY

Pigeon Tests Show Thirst Ruins Appetite

➤ THE STRENGTH of hunger depends upon thirst, at least for pigeons. This interdependence of hunger and thirst was shown by experiments with key-pressing pigeons reported to the Eastern Psychological Association meeting in New York.

Three adult pigeons were trained by Drs. B. F. Skinner and C. B. Ferster of Harvard University to secure food and water by pecking at colored keys. Pecking the white key would bring food out of a machine. Pecking a green key would bring water.

When the pigeon had gone without water for a long time, he would slow down in his pecking at the white food key. When he had just consumed an overabundance of water, his pecking at the white key went way up.

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ASTROPHYSICS

Identify Solar Line

➤ TEMPERATURE OF the sun's corona may be even higher than the presently used 1,000,000 degrees Centigrade, a discovery at the High Altitude Observatory, Boulder, Colo., suggests.

The corona is the giant pearly white halo of the sun, spectacularly visible during an eclipse, but usually hidden by the million times brighter light of the sun. Using a special device, known as a coronagraph, scientists can produce an artificial eclipse for studying this part of the sun's outer atmosphere.

Wih it, they have confirmed that a previously unidentified yellow emission line of the solar corona is caused by calcium atoms that have been stripped of 14 electrons. This line can be found only when very violent events, such as sunspots, are seen to take place on the sun.

Dr. Walter O. Roberts, director of the Observatory, states that, in order for the calcium to be present in such a state, "there must be some source of powerful ionization corresponding to temperatures higher" than 1,000,000 degrees Centigrade.

The identification was made under the sponsorship of the Office of Naval Research by Dr. Roberts, Donald E. Billings and Charlotte Pecker of the Observatory staff. Mrs. Pecker is a Fulbright scholar on a one-year leave of absence from Clermont-Ferrand University in France.

Identity of the yellow coronal line has puzzled scientists since it was found 16 years ago by Bernard Lyot of the Meudon Observatory, inventor of the world's first coronagraph.

Emission lines in the solar corona were first discovered by the American astronomers Harkness and Young in 1869. Their cause was a long-standing mystery, however, since not a single one agreed in wavelength with the spectrum lines given by any known atoms in laboratory measurements. The name "coronium" was given to the unknown atomic gas.

In 1940, Dr. Bengt Edlen of the University of Uppsala, Sweden, identified the atomic composition of almost all of the lines. In particular, he showed that the principal spectrum lines, the green coronal line and the red coronal line, both arose from iron, but iron at so high a temperature and so low a pressure that it is impossible to produce its spectrum lines in the laboratory. Thus he explained the failure of previous investigators.

The suggestion, now confirmed, that the yellow line was due to calcium was made by Dr. Max Waldmeier of the Eidgenossische Sternwarte in Zurich, Switzerland. Details of the identification will be published in *Comptes Rendus*, official journal of the French Academy of Sciences.

Science News Letter, April 17, 1954

MEDICINE

Hormone-Radiation Use

Combination of simultaneous treatment with both hormones and X-rays has achieved dramatic results in the fight against advanced, incurable breast cancer.

► SEX HORMONES and X-rays have achieved dramatic results in treating women with far advanced incurable breast cancer, four scientists from the Los Angeles County Hospital and University of California have found. The method will be tried on prostate cancer in men.

The combined hormone-radiation treatment was discovered by accident eight years ago when a woman taking the male hormone, testosterone propionate, was given X-ray treatment to a tumor mass. The woman's case was far advanced and represented a recurrence after radical surgery.

Today the woman is still living without detectable evidence of the disease. She continues to take regular hormone treatment, and works without any disability as a housewife.

Drs. Ian Macdonald, Pierre Haig, Lewis W. Guiss and Sidney Zucherman have given the treatment to 58 women, all in advanced states of the disease.

Dr. Macdonald said that two patients are still living after eight years, one the first patient above. Three patients have lived for seven years—two without signs of disease and the other now in the terminal stages.

The combined treatment effectively controls the pain and other suffering of advanced cancer for 19 months for the whole group of 58, compared with about a year for either hormones or X-rays alone. The average longevity of life after the start of treatment is 27 months, compared with 14 months on hormones alone and 16 months for radiation alone.

During eight years, Dr. Macdonald said, the group has discovered that doses of X-rays one-half to one-third the normal for cancer are most effective. Most of the earlier patients received higher doses, and the period of control and longevity were shorter for those women than later patients who received reduced dosage.

Thirty-two of the patients are still living. The hormones are given regularly and X-ray is applied to tumor masses as needed.

The group is now extending the treatment to women in more favorable condition. These patients, however, have also had previous treatment that failed to halt the disease.

With 12 patients treated for two to three years, only one has died and nine are now without evidence of the disease. Most of these 12 had had surgery.

Dr. Macdonald emphasized that breast cancer is a highly variable disease and many women live for long periods under all the existing forms of treatment. At the Los Angeles County Hospital, records show only eight patients who have received no treatment for advanced breast cancer. They refused treatment, and the average period of longevity in these women was five and a half months.

The next steps in the development are to get more patients, and to try similar methods with cancer of the prostate gland in men. If the results hold up when twice as many patients have been treated, Dr. Macdonald indicated that the hormone-radiation therapy would become the treatment of choice at the hospital.

Hormones Are Linked

► THE SEX hormones have been definitely linked to two kinds of tumors in hamsters by a Stanford University Medical School scientist.

Dr. Hadley Kirkman has found that injection of both the male and female sex hormones brings about the development of a benign tumor under the hamster's sex skin, a pigmented spot on the back of the animal.

If the hormones, androgen and estrogen, are withdrawn, the tumor stops growing but does not regress.

Dr. Kirkman found that if a part of the tumor were transplanted to another part of the animal, it became malignant and started spreading first to the lungs.

Estrogen, the female hormone, injected in young male hamsters brings about the development of a kidney tumor similar in some respects to the Wilms' tumor that strikes children. Dr. Kirkman has previously found these tumors were malignant and spread.

When the estrogen was withdrawn, both the primary tumor and the secondary tumors regressed. This is a very uncommon finding in cancer research.

Protein Acid Production

► THE CONTROL of growth in living cells, the heart of the cancer problem, has been linked to a substance common to all living things by Dr. Arthur B. Pardee, biochemist at the University of California, Berkeley.

Working with "custom-built" bacteria, Dr. Pardee found that if bacteria were deprived of food necessary for the production of a nucleic acid called RNA, then the cells would not produce proteins for growth either.

He suggested that the formation of the RNA is probably necessary for the production of proteins in cells, and seems to direct the cell in this growth.

Scientists believe that the nature of cellular growth and multiplication must be understood before satisfactory solution to the cancer problem can be found. If Dr. Pardee's work with bacteria can be applied to other living things, growth control may be ultimately traced to the production of RNA in the cell. Cancer is cell growth and division without control.

Science News Letter, April 17, 1954

PHYSIOLOGY

Skin Test Tells Sex In Doubtful Cases

► A SKIN test that will tell the basic sex of persons who have both male and female organs was announced by Dr. Murray L. Barr of the University of Western Ontario at the meeting of the American Association of Anatomists in Galveston, Texas.

A cell component called chromatin is almost always found in the nucleus of female skin cells, but seldom in the nucleus of male skin cells, he reported.

The presence or absence of chromatin, therefore, gives a clue to individual sex as carried to the embryo originally by the chromosomes, or units of heredity.

In a study of 30 patients of doubtful sex, called hermaphrodites, Dr. Barr found from the skin test that 17 had female type nucleus. This group included three true hermaphrodites and 14 so-called female pseudohermaphrodites.

The other 13 patients showed a true male type skin cell nucleus. This group included only one true hermaphrodite, one female pseudohermaphrodite and 11 male pseudohermaphrodites.

The rare true hermaphrodites, Dr. Barr concluded, have skin cells of either female or male types. Patients in the main group of female pseudohermaphrodites, a condition caused by overgrowth of the adrenal glands, have female type skin nuclei. Male pseudohermaphrodites have male type skin cell nuclei.

Science News Letter, April 17, 1954

MEDICINE

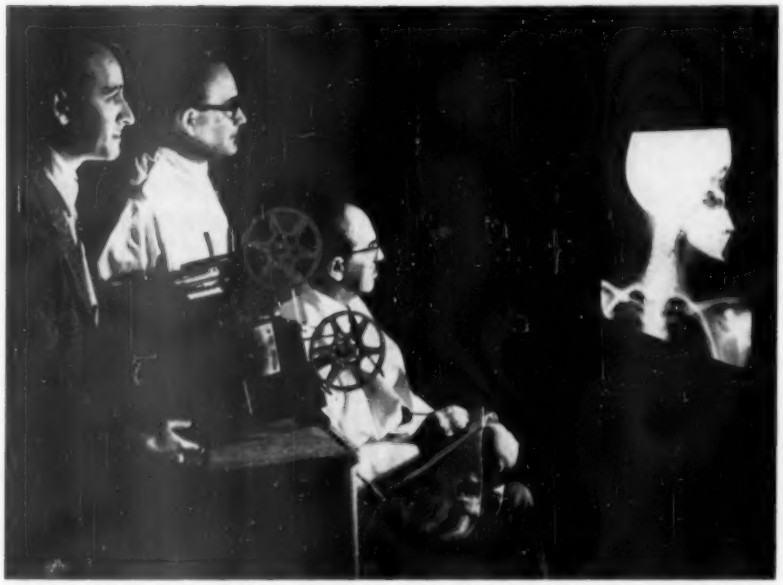
Recovery Sign For Heart Patients

► IF THE sex drive is greater than the fear of sudden death in a patient recovering from a heart attack, the patient is "good material for rehabilitation," Drs. Jerome G. Kaufman of New York and Marvin C. Becker of Newark, N. J., declared at the meeting of the American College of Physicians in Chicago.

Resumption of sex life, they find, seems more important to most heart attack survivors than when they can go back to work.

Three out of four who survive a heart attack are able to go back to work. Heart patients, the doctors reported, have proved themselves in the shipbuilding, automobile, farm equipment, pharmaceutical, public utility, photographic and other industries.

Science News Letter, April 17, 1954



SLOW MOTION X-RAY—Members of the University of Rochester medical school are showing X-ray movies, using the new projector they developed that permits projection at film speeds as low as six frames per second without flicker. From the left, they are Sydney A. Weinberg, one of the designers of the apparatus, Dr. Frank Campeti and Dr. George H. Ramsey.

PSYCHOLOGY

Attitudes Toward Children

Russians are no more dictatorial toward their children than are Americans, tests given to 51 displaced persons from behind the Iron Curtain show.

► FORMER SOVIET citizens are no more dictatorial in their attitudes toward children than are Americans, Drs. Eugenia Hanfmann and Jack Getzels of the Russian Research Center, Harvard University, told the Eastern Psychological Association meeting in New York.

This was disclosed by a test administered to 51 Russian displaced persons interviewed in Munich, Germany, and 51 Americans matched to the Russians in age, sex, educational and occupational status.

The test consisted of describing to the individual a situation of conflict between two family members and asking him to tell how it came out.

Both Russians and Americans considered equally the importance of the child. In discussing conflict involving grown-up sons and daughters, both groups asserted equally strongly the right of the young people to plan their own lives.

However, the Russians placed a greater value on continued family belongingness and family unity, and they assumed that both parents and children would be motivated more by these wishes than by desire for self-expression and freedom. The Russians also assumed the existence of a harmonious relationship between husband and wife more frequently than did the Americans.

Other personality differences found between Russians and Americans in the Munich interviews were described to the same meeting by Dr. Helen Beier, also of the Russian Research Center.

Russians are preoccupied in a marked way with the problem of truthfulness, Dr. Beier reported. They are strikingly concrete in their discussions and show less interest in analyzing their own motives and actions. They give in easily to their impulses and although they condemn this indulgence, they display relatively little punishing attitude toward people who do. This easy acceptance of themselves is linked with a feeling of closeness to other people and a need for social interaction. They tend to have less doubt about being accepted by others than do Americans.

This information about the Russian character was obtained by giving a battery of clinical personality tests to the former Soviet citizens interviewed in Germany.

Science News Letter, April 17, 1954

HERPETOLOGY

Rattlesnake Rattles Faster When Warm

► THE RATE at which rattlesnakes rattle depends on the animal's temperature. When warmed to normal body temperature of a warm-blooded animal, the cold-blooded rattler rattles about six times as fast as at an icebox temperature of just above freezing.

Findings on the rate of rattling of these snakes over a large temperature range, apparently not recorded before, are reported by Drs. L. E. Chadwick of the Army Chemical Center's Medical Laboratories near Edgewood, Md., and Hermann Rahn of the University of Rochester School of Medicine and Dentistry, Rochester, N. Y., in *Science* (April 2).

The to and fro movement of the rattle is made by three large muscle groups on each side, the scientists report, with the groups on each side contracting simultaneously during rattling.

The rattlesnake's rattling is done at a speed comparable to the wing beat of the humming bird or of various insects, but the studies suggest that there is no alternation of contractions in sequences in the three muscle groups to account for the high speeds of rattling.

The tail muscles that move the rattle are dark red to brown, in distinct contrast to other skeletal muscles of the snake's body, which are white to light pink. This suggests a high content of muscle hemoglobin or other pigment which might be essential for both the high speed and long duration of uninterrupted rattling.

Continuous rattling for as long as 20 minutes has been reported.

Science News Letter, April 17, 1954

BIOPHYSICS

Body Radioactivity Near Tolerance Limits

► THE AMOUNTS of radioactive substances normally deposited in human bodies, even when they are not exposed to fall-out ash or other radioactivity from A- and H-bombs, are close to the accepted tolerance.

This finding comes from studies by Dr. A. T. Krebs of the Army Medical Research Laboratory at Fort Knox, Ky.

The amounts of radium element Dr. Krebs found in normal bodies, however, seem to be well below the accepted permissible radium content.

In reporting his study in *Science* (April 2), Dr. Krebs points out that measurements of radioactivity in the human body should be interpreted with regard to whether the element radium is being measured, or the radioactivity from other elements in the body, such as potassium and carbon.

The amounts of radioactive substances in normal bodies, although they bring the "irradiation burden" close to accepted limits, are much lower than the toxic amounts found so far in radium poisoning cases.

Science News Letter, April 17, 1954

MEDICINE

Three Signs of Pain Showing Heart Trouble

➤ PAIN IN the chest must have three or more characteristics before it can be taken to mean heart trouble or no heart trouble, Dr. Arthur M. Master of the Mount Sinai Hospital, New York, told members of the American College of Physicians meeting in Chicago.

Heretofore, doctors have considered chest pain to come from the heart if it had any one of six characteristics.

Dr. Master and Drs. Harry L. Jaffe and L. Pordy of the Mount Sinai Hospital investigated 200 patients with coronary disease and angina pectoris, all with abnormal electrocardiograms; 100 patients who had recovered from a coronary occlusion; 25 patients with rheumatic heart disease, and 200 patients with non-cardiac pain.

"We found there were numerous exceptions in each of the six criteria used," Dr. Master said.

Consequently, they believe doctors need three or more signs about chest pain before making a diagnosis. Three or more of the following may mean the pain is from the heart:

1. The pain is located below the breastbone.
2. It is constricting or oppressive.
3. It is brought on by effort.
4. It radiates into the left arm.
5. It lasts only a short time.
6. It is relieved by nitroglycerin.

Non-heart pain must have three or more of the following characteristics: location in the left chest, aching quality, long duration, occurrence at rest, absence of radiation and failure to be relieved by nitroglycerin.

Science News Letter, April 17, 1954

NUTRITION

New Milk Drink Adds Diet Protein

➤ DEVELOPMENT OF a new non-fattening but high protein milk drink is announced in the *Journal of the American Medical Association* (April 3).

Babies and old people who need extra protein, patients with heart, kidney and liver diseases, and very fat people on reducing diets may all benefit from this new milk product.

It is called Kralex. Its advantages as a protein supplement to be eaten or drunk instead of injected are reported by Drs. Gilbert H. Marquardt, George M. Cummins Jr. and Charles I. Fisher of Chicago, and Dr. Lloyd A. Riggs of New York.

Kralex differs from the milk for heart patients announced by the Los Angeles County Heart Association (see SNL, April 3, p. 215), which is regular fluid milk from which the salt has been removed.

Kralex is made from skim milk, so it lacks the fat of regular milk. It is low in salt content, also lacks other minerals and vitamins, and is not considered or meant to be used as a balanced food. Reportedly very palatable, Kralex can be served hot or cold, flavored with fruit flavors, or it can be used as a base for puddings or cream soups. The milk drink is expected to be a relatively low cost source of protein.

It is made by passing skim milk through ion exchange columns. This process, done continuously, reduces the mineral and vitamin contents of the milk. It is then pasteurized and concentrated by evaporation under vacuum. Casein, a milk protein, is then added in amounts enough to double the protein content of the skim milk. The material is either spray dried into a powder or poured into cans and sterilized.

Science News Letter, April 17, 1954

BIOCHEMISTRY

Wood Pulp May Yield Blood Pressure Remedy

➤ CHEMICALS FROM wood pulp and soy bean plants may be future medicines for patients with high blood pressure.

This appears from a report by Drs. Maurice M. Best, Edward J. VanLoon, Charles H. Duncan and Joan D. Wathen, all of the University of Louisville Medical School and the Veterans Administration Hospital, Louisville, Ky., at the meeting of the American Heart Association in Chicago.

These plant chemicals, the Louisville group found, lowered the amount of cholesterol in the blood of normal persons and of those who had abnormally high amounts of cholesterol in their blood.

Too much cholesterol is believed by some to play a role in hardening of the arteries and subsequent high blood pressure.

The plant chemicals are called sterols. They brought down the amount of cholesterol in the blood without any special diet being given to the patients. So far no toxic effects have been observed.

Science News Letter, April 17, 1954

PSYCHOLOGY

Intelligence and Hand Dexterity Go Together

➤ THE IDEA that pupils who fail in the three R's will excel in the use of their hands is wrong, Dr. Maurice H. Fouracre of Teachers College, Columbia University, New York, declares.

Contrary to popular opinion, he finds that the correlation between intelligence and manual dexterity is exceedingly high.

"Consequently, the mentally retarded are usually not as capable manually as their non-retarded peers," he states.

One of the most important ways a teacher can help a retarded child is to teach the child good work habits, which are closely linked with success in doing a task. Directions should be given orally and repeated as often as necessary, he advises in the *Journal of Home Economics* (April).

Science News Letter, April 17, 1954

IN SCIEN

STATISTICS

Life as Long for College Athletes as Intellectuals

➤ SPORTSMEN AND "intellectuals" live about the same length of time. A study of 834 Cambridge University rugby football players, cricketers, track men and crew men, and 761 fellow students who were not athletes, shows this, Sir Alan Rook, senior health officer, Cambridge University, reports in the *British Medical Journal* (April 3).

The athletes and the non-athletes whose histories were studied were at the University between 1860 and 1900.

Heart and blood vessel diseases did not kill significantly more of the sportsmen, nor take them at earlier ages than intellectuals.

Sir Alan found some evidence that the heavily built men did not have as good prospects for a long life as the more lightly built men.

Science News Letter, April 17, 1954

BIOCHEMISTRY

Female Hormones For Artery Disease

➤ FEMALE SEX hormones are now being tried as a possible medicine for coronary artery disease, Dr. Irvine H. Page of the Cleveland Clinic Foundation revealed at the meeting of the American Heart Association in Chicago.

Dr. Page called this a "promising lead," but said that there is no convincing evidence yet that they are of practical value.

When given to chickens in which the heart's artery has been damaged, these female hormones make the damage disappear. They are now being tested with some men who have suffered heart attacks.

A second important lead reported by Dr. Page is from research with the anti-clotting chemical, heparin. Heparin also has the ability to combine with other substances in plasma to clear fatty particles from the blood.

This research, Dr. Page said, may eventually give a technique for detecting persons with early stages of artery hardening, which doctors call atherosclerosis and in which fatty substances carried by the blood are deposited in the artery linings.

At present, there are no practical ways of preventing or curing this artery hardening, Dr. Page said, although there may be ways of slowing its development. Because of the current interest and research on this disease, he said, "We must expect atherosclerosis to be 'cured' and its 'cause' proclaimed at least twice a year for the next ten years or so."

Science News Letter, April 17, 1954

CE FIELDS

PHYSIOLOGY

"Catch-Trap" in Lung Arteries Holds Clots

▶ DISCOVERY THAT the tips of lung arteries act as "catch-traps" was announced by Drs. William H. and Melvin H. Knisely of the Medical College of South Carolina at the meeting of the American Association of Anatomists in Galveston.

After a burn, these lung catch-traps catch large and small masses of blood cells that are stuck together. They hold them until the masses of sludged cells have slowly broken up.

The discovery, made under an Office of Naval Research grant, may lead to improved treatment of burns, particularly those affecting the lungs. The lung artery catch-traps were discovered by examining trans-illuminated living lungs of old and young cats and dogs and mature rabbits. The animals were all anesthetized and their lungs supplied with oxygen.

The living artery tips were found to be wide and rounded. For long distances, the walls of the sides and ends of the blunt artery tips consist largely of the rims of openings from tiny blood vessels into the artery tips.

At the instant of burning many of the visible lung artery ends shut completely. Most of them reopen in a short time. Within 30 seconds to one minute, the masses of stuck-together blood cells come down into the artery tips. There the largest masses are trapped immediately. Meanwhile blood continues to flow down and around the largest masses.

Gradually, perhaps affected by chemicals from the blood, the trapped masses disintegrate.

Science News Letter, April 17, 1954

GEOLOGY

Movement of Glacier 1,000 Feet in 5 Years

▶ IF YOU should thumb a ride on a glacier, do not expect to break any speed records. Ice on mile-wide Highway Glacier on Baffin Island was clocked by members of the Baffin Island Expedition and is now reported to the Arctic Institute. It had moved about 1,000 feet in five years.

However, not all parts of the glacier moved at the same rate or even in the same direction, Dr. W. H. Ward, English glaciologist, said in his report in *Arctic* (December, 1953).

Measurements were made by triangulation of the absolute movement of eight points on the surface at an elevation of about 2,500 feet where the surface slope is about three degrees. The points were observed on July 7, 1953, and 38 days later. Horizontal movement of the points parallel to the lengthwise direction of the glacier varied from 10 to 52 feet.

This irregular movement causes strain in the glacier, confirmed, Dr. Ward said, by the rate at which "crevasses adjacent to the steep rock walls visibly opened and closed around" one of the tents.

Summers are short on Penny Icecap, Drs. Svenn Orvig and B. H. Bonnlander, meteorologists on the expedition, report. There were only 14 days with maximum temperatures above freezing. The highest was 38.5 degrees Fahrenheit on July 25. Melting occurred only a few interrupted periods counted in hours.

Fog occurred almost constantly during the summer—on 25 days in June, 27 in July and eight of the first nine in August.

Wind speeds, however, were surprisingly low. In fact, blizzard conditions occurred on only nine days out of 85.

Seventeen new geographical names were assigned by the expedition and have been approved by the Canadian Board on Geographical Names, among them the Highway Glacier, Penny Icecap, and Mt. Battle after a young geomorphologist of McGill University who lost his life in the icy waters of a glacial stream while on the expedition.

Science News Letter, April 17, 1954

NUTRITION

Urge Doctors to Try Diets Themselves First

▶ DOCTORS SHOULD be made to try new diets themselves before prescribing them, Dr. Irvine H. Page, director of research at the Cleveland Clinic Foundation, declared at the meeting of the American Heart Association in Chicago.

His advice came after his own trial of the kind of low-fat diet some doctors advise for atherosclerosis, or hardening of the arteries.

When he reduced the fat content of his own diet to about 15% of the total calories, Dr. Page said, there was a sharp fall in blood fat levels, sharp loss of body weight, marked gastrointestinal disturbance, "an impairment of my disposition and a contraction of my circle of friends." When he added enough fat to overcome the ill effects, the blood fats quickly returned to previous levels.

"The experiment was ended after a year," Dr. Page said, "with the firm conviction that diets should be changed with the greatest caution and that physicians should be required to try their diets before prescribing them."

It remains to be seen, Dr. Page said, whether diets with a minimum amount of fat necessary for good health, but still low according to ordinary American standards will maintain a normal blood fat level. If the answer involves almost complete fat starvation, then, Dr. Page declared, "the problem seems to me almost insoluble in terms of diet."

Science News Letter, April 17, 1954

PHYSIOLOGY

Old Theory of Hair Growth Incorrect

▶ THE OLD theory that hair grew because the hair follicles in the "quiet" state set aside a "hair germ" to begin the process of new growth is not correct, Drs. William Montagna and Herman B. Chase of Brown University, Providence, R. I., told members of the American Association of Anatomists meeting in Galveston, Texas.

The outer sheath of the upper part of the hair follicle, they found, is most important for regenerating new hair.

The two scientists from Brown traced the pattern of hair degeneration and regrowth on the human scalp after treatments with X-ray. After the X-ray treatment, the entire matrix of the follicle bulb degenerates. This is followed by more gradual degeneration of the upper bulb, then by shedding of the hair. At this point, the remaining follicle becomes a solid core of cells from the outer sheath of the follicle.

At the same time this degeneration is taking place, the base of the follicle is retreating further into the skin. After five to seven weeks, the base of the follicle is resting half way up in the scalp skin.

Now the process of regrowth begins to take place. The first sign of this is an increase of the cells at the base of the follicle cord to make contact with the skin bud adjacent to them. After growing around this bud, the follicle continues to re-form and eventually grows a new hair.

Science News Letter, April 17, 1954

PSYCHOLOGY

Child Molesters Are Sexually Childish

▶ THE MALE sex criminal who molests little girls does so because he feels himself to be psychosexually childish, Dr. Emanuel F. Hammer of the New York Psychiatric Institute told the Eastern Psychological Association meeting in New York.

Dr. Hammer reported a study of 31 inmates of Sing Sing Prison convicted of rape, and compared them with another 33 Sing Sing inmates convicted of a sexual offense against a little girl.

A test designed to measure indirectly the psychosexual age of the men was given to both groups. Each man was asked to draw a tree. Then he was asked to tell the age of his drawn tree. Psychologists theorize that the age ascribed reflects the felt psychosexual age of the individual. The average age given by the rapists was 24.37 years; the average given by the sex offenders against children was 10.62 years.

The mental childishness of the child molesters is also reflected by the nature of their offenses, Dr. Hammer said. The overwhelming majority of them were guilty of peeping, exposing themselves, and feeling of their victims. These are childish expressions of the sexual urge, he explained.

Science News Letter, April 17, 1954

TECHNOLOGY

Riches From Sugar Cane

Bagasse is what is left when sugar is extracted from cane. Valuable as a raw material for paper and wall board, its chemicals help make dynamite and other industrial products.

By WATSON DAVIS

▶ IT TAKES almost 50 billion pounds of cane sugar to help satisfy the world's sweet tooth. Thousands upon thousands of acres of tropical and semi-tropical land are planted each year to sugar cane in various parts of the world.

Half of this great crop used to be waste. The stalks of the cane, when squeezed dry of their sweet burden, were burned or left to rot.

But now what was once almost a nuisance is proving to be a source of riches. Tons upon tons of cane residue, called bagasse, are being used industrially for a variety of astounding products. The supply of bagasse is immense. For every pound of sugar produced, there is about a pound of bagasse available.

Wall board was the first large-scale product made from bagasse. Tests have shown that sugar cane waste can be used as raw material for paper for newspapers, and even more finished papers, replacing spruce and other woods.

However, in addition to the strong fibers and absorbent pith of bagasse, there are in it valuable chemical substances that are a challenge to the industrial chemist. Already a variety of products ranging from filler for dynamite to plastic for phonograph records have been produced.

The U. S. Department of Agriculture estimates that in 1951, 24,079,000 short tons of cane sugar were produced around the world. (One short ton equals 2,000 pounds.)

Sugar Now Primary Product

That year in the continental United States, some 419,000 tons of cane sugar were produced, mostly in Louisiana and Florida. The U. S. and dependencies — Hawaii, Puerto Rico and the Virgin Islands—together produced 2,811,000 tons of cane sugar in 1951.

This astounding quantity of cane sugar—almost 50 billion pounds in a single year throughout the world—all comes from the sweet juices stored in the pithy interior of sugar cane. When it is ripened in the warm sun of the lower latitudes and its pith is turgid from sugar-laden juices, the cane is cut close to the ground, collected and hauled to a processing station. There the cane is ground to squeeze out the juices, which are then collected and carried away for further processing into crystalline sugar.

There remains after extraction of the juices a tremendous quantity of ground-up cane—fiber and pith—as a by-product. When excess moisture is removed by drying, this cane residue, called bagasse, weighs about the same or somewhat more than the sugar extracted from the whole cane. "Bone-dry" bagasse on hand throughout the world from cane sugar production in 1951 has been estimated at 24,793,000 tons.

In the continental United States, some 615,000 tons of bone-dry bagasse resulted from the 1951 cane crop, while the figure was 3,127,000 tons for the U. S. and dependencies together. Cuba, the chief source of sugar for the United States, produced 7,964,000 tons of raw cane sugar in 1951, with an estimated 8,000,000 tons of bagasse as by-product.

The spectacle of such massive amounts of potentially valuable raw material, with its strong fibers, absorbent pith, composed of valuable chemical substances, has been a source of hope for increased revenue for the sugar producer and processer.

While the major tonnage of bagasse today still is used only to stoke the furnaces of sugar plants, more and more of it is being used in bold manufacutring ventures.

Two principal kinds of tissue make up the bagasse—hard, strong fibers that form the outer covering and support of the cane, and the soft inner pith.

The pith, or parenchyma, represents the broken walls of the living cells in which the sugar-laden juices were stored. Chemically, the pith is made up very similarly to the fiber portion of bagasse, but the pith lacks a fibrous structure and strength.

The sturdy bagasse fibers have been found excellent for the manufacture of many kinds of paper and wall board, and in some paper-making processes the pith need not be removed. But for many purposes, pith must be separated from fiber for the best product.

In the manufacture of crystalline sugar from cane juices, there is left a residue of thick, sweet, dark-colored liquid—"black strap" molasses, or treacle. This by-product, in terms of nutritional value, makes an excellent supplementary feed for livestock, but it is difficult to ship and although animals like it, it is not easy to feed in liquid form. It is used to make cattle eat unpalatable feeds.

Bagasse has about the same food qualities as fair grade prairie hay, but it becomes palatable when it is soaked in blackstrap molasses. Cattle feed is made using ground whole bagasse, blackstrap and urea slightly dried. This gives a solid, easily-transportable supplementary feed that is relished by livestock.

Bagasse, with its long, strong fibers, its ready availability and its comparatively low

THIS IS BAGASSE—The skeletal material of sugar cane, which promises to be an important raw material for newsprint and chemicals in the future, is shown in this photograph.

cost, has long been eyed as an excellent and logical source of raw material for the manufacture of paper. One proposed process for making paper from bagasse dates back to 1838, and the Baltimore Advocate was printed on bagasse paper in 1856.

Since 1938, commercial ventures in the production of bagasse paper-making material have been successfully undertaken in England, Formosa, the Philippines, Peru, Argentina, Colombia, Brazil and India. Research is going on in the Dominican Republic at present towards bagasse paper production. In the United States, the Valite Corporation in Louisiana, when it gets into full production, is expected to turn out 50 tons of newsprint a day; limited production is already under way there.

Wall Board Industry Oldest

Approximately 2,000,000 square feet of insulating and wall board products are manufactured from bagasse every day in the continental United States. This represents the oldest successful and profitable industrial utilization of bagasse in this country. One concern, the Celotex Corporation, has been manufacturing insulating and wall board from bagasse as building materials for over thirty years. Similar building materials have been made in Hawaii, Australia, Cuba, England and Formosa.

In the production of board, bagasse is cooked in water or dilute chemicals to soften the fibers and make them more flexible. The treated fibers are cut into the desired length and thickness, suspended in water, then felted continuously into a thick mat. The wet mat is rolled through a press that squeezes out excess water.

If insulating board is to be made, the pressed sheet of matted fibers is dried out in a tunnel drier, so that air spaces run through the maze of fibers to furnish insulation. To make hardboard products, the matted fibers are packed hard together between heated plates of a hydraulic press. At present, this use of bagasse as boarding accounts for the major part of bagasse used industrially in the United States.

Fine particles of pith separated from bagasse in the production of pith-free fiber are used as a filler in low-density, permissible-dynamite explosives. Preferable to wood flour, bagasse pith has become a standard material for this task.

On the farm and garden, macerated bagasse has found wide application as chicken litter and limited use as a mulch material.

Bagasse is more than an ideal source of useful fiber. It is a natural source of certain chemicals used in the manufacture of industrial resins. These chemicals—formaldehyde, furfuraldehyde and various ketones—react with phenols and similar chemicals to make resins, important elements of the plastics industry.

Much of the original research on using bagasse, and other fibrous material such as corn stalks, as a source of plastic materials was done by scientists of the U. S. Department of Agriculture. The first practical commercial plastic molding compound was produced in 1941 by the Valite Corporation, two years after that company started out on the basis of the Agriculture Department's discoveries. The firm has since developed scores of resin products for bagasse.

Under the basic Valite process, means have been found to decompose bagasse into constituent chemicals while reacting them simultaneously with phenol, under heat and pressure. In the course of a very few minutes, there results from this mixture the formation of resins of a plastic type.

Two Kinds of Resin

In a typical case, bagasse and necessary chemical reagents are placed into a large, revolving pressure cooker, where digestion of the bagasse begins under high pressure. Soon the contents of the pressure cooker change into a black, resinous, sticky mass, bearing no resemblance to bagasse.

Digestion is continued for different lengths of time, depending on the type of final product desired. The resulting resin is treated further after removal from the pressure cooker to make it thermoplastic or thermosetting.

After this treatment, the resin is poured onto large, slowly revolving steel drums where it hardens into a brittle layer. Sharp knife-like blades chip the hardened resin off in the form of black flakes.

These are flakes of a thermoplastic resin. Under heat and pressure, thermoplastic resins can be melted and reformed into almost any shape desired. Much is used for the making of phonograph records.

Bagasse resins were first developed for use in records during World War II, when the usual shellac constituent became almost impossible to obtain. Since then, bagasse resins have become a staple material in the manufacture of a large percentage of records.

The possibilities of bagasse-derived products will increase with research. One day sugar cane may be grown primarily for bagasse, with sugar the "by-product."

Science Service has prepared a kit containing specimens of sugar cane bagasse, resin flakes, bagasse newsprint and a sample of a newspaper printed on bagasse newsprint. There are also samples of thermosetting resin and thermoplastic resin. The Sugar Cane Bagasse kits are available at 75 cents each at Science Service, 1719 N St., N.W., Washington 6, D. C.

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THE ADVANCEMENT OF SCIENCE: Vol. X, No. 40—*British Association for the Advancement of Science*, 108 p., illus., paper, 7s 9d per copy, £1 5s per year. Scientific papers on timely subjects.

THE BEHAVIOUR AND SOCIAL LIFE OF HONEY-BEES—C. R. Ribbands—*Bee Research Association (Hale)*, 352 p., illus., $4.50. A non-technical report of research, supplemented by inference and speculation on the part of the author who is principal scientific officer of the Bee Department of Rothamsted Experimental Station, England.

CEMENT AND CONCRETE REFERENCE BOOK 1954—*Portland Cement Association*, 112 p., illus., paper, free upon request direct to publisher, 33 West Grand Ave., Chicago 10, Ill. Facts about the history, manufacture and uses of portland cement and concrete.

DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH: Report for the Year 1952-53—*Her Majesty's Stationery Office*, 315 p., paper, $1.80. Reporting research accomplishments of the year and giving details of a five-year plan for the future.

DUSTY — Veterans Administration Training Guide—*Govt. Printing Office*, 23 p., illus., paper, 20 cents. Teaching, in comic strip technique, the art of sanitary dusting in hospitals.

THE FABULOUS INSECTS—Charles Neider, Ed.—*Harper*, 278 p., $3.50. A collection of insect stories by a large number of such famous nature writers as Fabre, Teale and Beebe.

THE FIRST BOOK OF COTTON—Matilda Rogers—*Franklin Watts*, 69 p., illus., $1.75. Tracing for children the story of cotton from the time it is growing in the snowy field until it is made into garments or home furnishings.

GEOLOGY OF THE PALEN MOUNTAINS GYPSUM DEPOSIT, RIVERSIDE COUNTY, CALIFORNIA — Richard A. Hoppin — *California Division of Mines*, Special Report 36, 25 p., illus., paper, 75 cents. The gypsum is of high quality, but its value is lessened by fragments of marble that will increase the cost of mining.

HIGHLIGHTS OF COLOR TELEVISION—John R. Locke Jr.—*Rider*, 43 p., illus., paper, 99 cents. Based on the recommendations of the National Television System Committee for a compatible system, which means that present black-and-white receivers will pick it up.

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INSECT METAMORPHOSIS—R. E. Snodgrass—*Smithsonian*, Miscellaneous Collections, Volume 122, Number 9, 124 p., illus., paper, $1.20. The change from caterpillar to butterfly is so dramatic that we are likely to overlook the even more striking change from butterfly to caterpillar. Early insects, the author tells us, lived on land and developed without metamorphic changes, which are of relatively late origin.

INTRODUCTION TO COLOR TV—Milton Kaufman and Harry E. Thomas — *Rider*, 140 p., illus., paper, $2.10. Devoted to fundamental principles of operation, this book does not take sides in the "battle of the picture tubes" or in differences over circuitry.

LOST CONTINENTS: The Atlantis Theme in History, Science, and Literature—L. Sprague de Camp—*Gnome*, 362 p., illus., $5.00. An account of the various "lost continents" and the people who have argued for them and the others who have tried to de-bunk them.

MARINE TROPICALS — Ed L. Fisher — *Sub-Marine Studios*, 55 p., illus., paper, $1.50. Instructions for collecting and keeping salt water fish and sea life alive in a small home aquarium.

MATH E MAGIC: MAGIC, PUZZLES AND GAMES WITH NUMBERS—Royal Vale Heath—*Dover*, 126 p., illus., paper, $1.00. Fun you can have with numbers while baffling your friends with your "mind reading" powers.

MONARCH BUTTERFLY—Marion W. Marcher—*Holiday House*, 46 p., illus., $2.00. A child's story of the life of one of the most beautiful of living creatures, among whom the male wears perfume. A section tells how to raise them.

MOPPY — Veterans Administration Training Guide — *Govt. Printing Office*, 45 p., illus., paper, 30 cents. Teaching, in comic strip technique, how to get rid of unsightly dirt and dangerous germs in a hospital.

NURSE AND PATIENT: An Ethical Consideration of Human Relations—Evelyn C. Pearce, foreword by the Rt. Hon. The Lord Webb-Johnson—*Lippincott*, 182 p., $3.00. "It is essential," the author emphasizes, "to remember that patients are people."

PARROTS AND PARROT-LIKE BIRDS—The Duke of Bedford—DISEASES OF PARROTS—David L. Coffin—*All-Pets Books*, 210 p., illus., $6.00 For bird lovers.

PORCELAIN ENAMEL IN THE BUILDING INDUSTRY: Research Conference Report No. 6, November 12 and 13, 1953—Edward H. F. Dickens, Ed.—*Building Research Advisory Board*, 146 p., illus., paper, $6.00. Technical papers discussing the qualities and uses of this new building material.

RESEARCH CENTER, ASSOCIATION OF AMERICAN RAILROADS ANNUAL REPORT 1953—*Association of American Railroads*, 39 p., illus., paper, free upon request direct to publisher, Public Relations Department, Transportation Building, Washington, D. C. Reporting major research activities of the year and outlining future plans.

SPECIALIZED HOME RADIO MANUAL: Volume 8, RCA June 1951-December 1953—*Rider*, 96 p., illus., paper, $1.65. Servicing information.

SWEEPY — Veterans Administration Training Guide—*Govt. Printing Office*, 28 p., illus., paper, 25 cents. How to get rid of the "dust puppies" in hospitals.

THE SYNTHESIS OF X-RAY SPECTROMETER LINE PROFILES WITH APPLICATION TO CRYSTALLITE SIZE MEASUREMENTS—Leroy Alexander—*Mellon Institute*, 7 p., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. Making use of the convolution principle to predict theoretically the nature of the line profiles to be expected under various experimental conditions.

TV MANUFACTURERS' RECEIVER TROUBLE CURES: Volume 5—Milton S. Snitzer, Ed.—*Rider*, 120 p., illus., paper, $1.80. The manufacturer's own answers to some of the problems that may come up in the use of their particular receivers.

WAXEY — Veterans Administration Training Guide—*Govt. Printing Office*, 45 p., illus., paper, 30 cents. Comic strip characters tell how to wax hospital floors to protect the surface and not endanger the nurse or patient.

YOU AND YOUR ALLERGIC SKIN — Herman Hirschfeld—*Nelson House*, 24 p., paper, 25 cents. Cosmetics, plastics, plants, inhalants and the newer synthetic wearing apparel have greatly increased the number of sufferers of skin allergy. This booklet is addressed to them.

Science News Letter, April 17, 1954

PSYCHOLOGY

Words Help Solve Non-Verbal Problems

► WORDS CAN help you solve a problem even when the problem is not a verbal one, Dr. Charles N. Cofer of the University of Maryland reported at a Conference on Human Problem Solving in New York.

A particular problem he described consisted of tying together two strings hung a distance apart from the ceiling. However, the strings were not long enough to take hold of one, walk over to the other and tie the two together.

There are several possible solutions, but these are the most common:

1. Tie one string to an object nearly midway between the two strings, so that it will be held there while you get the other string.
2. Hold one string in one hand, and "fish" with a tool for the other string.
3. Tie a heavy object to one string and set it to swinging, catching when the swing brings it close to the other string.

The help given by words was tested by an experiment. Three groups of subjects were given a list of words to learn on each of five days before they undertook the string problem. A fourth group did not learn any words, but did have the string problem. For only the first group, Group A, the words rope, swing and pendulum occurred together in one of their lists.

Men having just learned the words "rope," "swing," and "pendulum" were helped by this to catch on to the pendulum method of solving the problem.

Of the men in Group A, 68% got the pendulum solution to the string problem, as compared with 58% of Group B and 47% of Group C. Group D was less successful.

Girls, however, were not aided by the words in this case. Few of them thought of the pendulum solution, and there was no significant difference among the girls.

Science News Letter, April 17, 1954

MEDICINE

Preventing Strokes

➤ PATIENTS WHO have had a stroke of apoplexy from a blood clot in the brain can be protected from future strokes by anti-blood clotting medicines, it appears from a report by Drs. Irvin S. Wright and Ellen McDevitt of Cornell University Medical College, New York, to the meeting of the American College of Physicians in Chicago.

These drugs are the synthetic, dicumarol, and heparin sodium, usually obtained from the livers or lungs of animals at the slaughter house. They would not help patients whose strokes came from hemorrhage into the brain.

The drugs may even help patients recover from a stroke, medical men believe. There is as yet no conclusive evidence for this, Dr. Wright said, but a study intended to show whether or not this is the case is now being made.

At the meeting, he and Dr. McDevitt reported on 57 patients with severe heart or blood vessel disease who were treated with the anti-clotting drugs after a series of attacks of sudden blocking of a blood vessel by a blood clot or other plug.

In 669 patient-months before starting the drug treatment, the 57 patients experienced 193 such blockings of a blood vessel. Of these, 82 involved the brain. Following the start of the treatment, during a period of 1,031 patient-months, these patients experienced only 24 blocks by blood clots, of which seven were in the brain, the report showed.

There were 31 patients with rheumatic heart disease in the series, including 29 with erratic heart muscle action. The New York physicians reported that in 428 patient-months after the first stroke and before the institution of anticlotting therapy, the 31 patients experienced 139 blood clots, 47 of which were in the brain.

On drug treatment, they had only 12 embolic episodes, including five in the brain, in 672 patient-months. One group of six patients with rheumatic heart disease and erratic heart muscle action who remained on the drug continuously for 182 patient-months, two and one-half years average, suffered no further attacks. They had had 14 attacks previously.

There were 13 deaths in the total series. Two of the patients died of hemorrhagic complications, and seven of complications during periods when the therapy was interrupted. Four deaths were unrelated to the treatment.

Science News Letter, April 17, 1954

ASTRONOMY

Vastness of Universe

➤ IF YOU would like to get some idea of the vastness of the universe, the following relations have been worked out by Dr. Clarence H. Cleminshaw of Griffith Observatory, Los Angeles.

A farmer could cut a furrow from the earth to the sun in eight minutes if he plowed with the speed of light. Continuing at that speed, he would plow through the last dust fringes in the orbit of the outermost comet known at the end of a working day of eight hours.

Sticking to his eight-hour day after leaving our solar system to plow through the vast gulf between stars, he would have to furrow at light's speed for about 13 years before he reached the end of his field, or the nearest star, Alpha Centauri, which cannot be seen from most of the Northern Hemisphere.

His field would have been plowed in 4.3 years if he had worked 24 hours a day, as light does.

The distances to stars are commonly expressed in light years, or the distance covered by light traveling at 186,000 miles a second in one year. One light year is equal to nearly six trillion miles.

That part of space at which the 200-inch telescope atop Mt. Palomar in California can peer includes galaxies about two billion light years distant. Galaxies are so far away that they look like points of light with the naked eye, yet they consist of myriads of stars separated by much greater distances than the field plowed by the farmer furrowing from earth to the nearest star.

Dr. Cleminshaw's suggested relation of the plowed field, with diagrams, is made in the *Griffith Observer* (April).

Science News Letter, April 17, 1954

PSYCHOLOGY

Trouble Shooting Urged As Subject for Research

➤ PRACTICAL PROBLEMS like trouble-shooting on a radar or a television set, or an automobile, have much in common with another military problem, that of interpreting aerial photographs.

Both types of practical problems provide a promising subject for research, Dr. Robert M. Gagne of the Armament Systems Personnel Research Laboratory, Lowry Air Force Base, Denver, Colo., told a Conference on Human Problem Solving in New York.

A trained technician looking at a malfunctioning radar screen knows that the trouble must be in one of a number of possible places. He then proceeds to eliminate these places one at a time, or in groups, by a series of checks. Some men have to make more checks than others.

In a problem cited by Dr. Gagne, 33 men out of 77 correctly diagnosed the trouble on their first try. Of these 33, only seven got the solution in the optimal pattern of four checks. A small number used fewer checks —probably these men made shrewd and lucky guesses. Some used 12 checks.

The task of photographic interpretation, although it looks very different, involves much the same procedure, Dr. Gagne said. The person who looks at an aerial photograph, and must say what industry is represented, looks for certain cues he has learned to identify, as the radar technician identifies the symptoms of malfunction on the screen.

He may see a power station, storage tanks, gas mains, a coaling tower, and so on. From these cues, he forms several alternate concepts of the various industries that might be represented. Then he looks for specific cues that would identify one of these industries and eliminate the others, just as the service man makes checks that would pin down one source of trouble and eliminate all the others.

Research could well be devoted to problems such as these and how the most efficient methods of solution could be taught, Dr. Gagne urged.

Science News Letter, April 17, 1954

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PSYCHOLOGY

Words Meaning Upward Actually Look Higher

▶ WORDS EXPRESSING in various ways an upward direction actually look higher. This was found in experiments described to the Eastern Psychological Association meeting in New York by Dr. Stanley E. Kaden of Clark University, Worcester, Mass.

In Dr. Kaden's experiments, 20 college students looked at luminous words exposed about six and a half feet away in a dark room. With heads fixed in position, they then moved the words up and down on a vertical track until they appeared to be exactly at eye level.

For words meaning upward, the apparent eye level was lower as compared with actual eye level than it was for words expressing downwardness. In other words, the "up" words had to be moved down to appear at eye level; the "down" words had to be moved up.

Science News Letter, April 17, 1954

BIOLOGY

"Blue" Blood of Lobsters Still Biological Mystery

▶ TRUE "BLUE BLOODS" in the animal kingdom are the lobsters, crayfish, crabs and their relatives. A blue copper pigment in their blood serves the same function as iron pigment in human beings.

The copper pigment, hemocyanin, serves as a vehicle for carrying oxygen in blue-blooded animals just as the iron pigment, hemoglobin, does in red-blooded creatures, the study shows.

Whereas the red pigment is capable of carrying oxygen in the ratio of up to 20 cubic centimeters per 100 cubic centimeters of blood, the blue pigment can carry only up to three cubic centimers of oxygen per 100 cubic centimeters of blood.

Hemocyanin is thought to have evolved from certain copper enzymes, which all red blooded animals, including humans, have in their bodies. Why certain animals developed blue oxygen bearing pigments while others developed red ones is still a mystery.

Science News Letter, April 17, 1954

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BOTANY

NATURE RAMBLINGS

Help Yourselves!

▶ CHILDREN, TURNED loose in the blossoming spring woods, are apt to indulge in an orgy of flower-picking, just from sheer exuberance of delight in the simple beauties their young minds can comprehend. It is a sad necessity for their elders to restrain them from gathering some kinds of flowers, lest none may be left for the next generation of children.

Violets, however, need no help from the parental or avuncular "don't." Little fingers may be permitted to take all they care to, of these favorites, so long as the plants are not pulled up roots and all—and with most species of violet that is not an easy thing to do.

For free leave to pick violets without fear of ill consequences there are two reasons. Violets are perennials, coming up for several years from the same root-mass, and propagating by simple vegetative growth and spread. Perennials are usually deeper-rooted and more resistant to even wanton attack than are annuals.

The second safety measure of the violet is even more interesting. Most flowers are dependent on the results of their own pollination for seeds. Not so the violet. While seed pods may follow the pretty blue and white and yellow flowers, the main crop of seeds is produced later, from a second production of flowers which most of us would never recognize as such. These are short-stemmed, bud-like affairs that never open and have no petals; they shed their pollen internally on their own seed-producing parts and thus insure an abundant crop of seed as it were in secret.

Botanists have a special name for flowers of this kind. They call them "cleistogamous." The word comes from two Greek roots that combine to mean "hidden marriage." And that is essentially what the whole strange proceeding amounts to.

With two kinds of flowers to produce seed, and vegetative increase to insure survival and supplement the plants' spread, it is not remarkable that violets are among the most successful of spring flowers. Not only do individual plants swarm in woodlands and over open fields; the number of separate species has evolved amazingly.

There are at least 300 different kinds of violets, ranging throughout the temperate regions, in habitats ranging all the way from swamps to dry, rocky mountain heights.

Science News Letter, April 17, 1954

MEDICINE

Heart Attack Survival

▶ AGE RATHER than sex affects survival after a heart attack, Drs. Louis N. Katz, David R. Cole and Evelyn B. Singian of Chicago reported at the meeting of the American Heart Association in Chicago.

And while far more heart patients in the group they studied were overweight or well-nourished rather than thin, body build did not seem to have a significant effect on the outlook for survival after a first heart attack.

Two out of three people who survive the first heart attack are able to go back to moderate or complete activity. Contrary to popular opinion that heart attacks usually mean early or sudden death, about three-fourths, or 77%, recover from a first attack.

Dr. Katz and associates reviewed the histories of 461 patients seen over a ten-year period, 1932 to 1941. They were able to get complete information on 390 up to the time of their death or, for the survivors, until Jan. 1, 1952. Of this group, 23% died within the first two months after the first heart attack. For the rest of them the average survival time was a little over eight years. Ten percent were still alive at the end of 15 years.

The ones who lived ten years or more were on the average some six years younger at the time of their first attack than those who died within two months. Men tended to have their first attack at a younger age than women. When the age factor was taken into account, however, sex did not appear to have any significant effect on the outlook.

High blood pressure before the heart attack, chest pain on effort and diabetes were other factors found important in determining survival. So were shock, congestive failure and pulmonary embolism after the attack.

When heart attacks came while the patient was resting or asleep, they were more serious and had a less favorable outlook than those that came during or after exercise or emotional stress.

Science News Letter, April 17, 1954

BIOCHEMISTRY

Detect Pancreas Cancer

➤ A SIMPLE starch test for showing disease, especially diffuse cancer, of the pancreas was announced by Drs. Theodore L. Althausen and Kahn Uyeyama of the University of California School of Medicine, San Francisco, at the meeting of the American College of Physicians in Chicago.

The test is based on the assumption that amylase, one of the digestive enzymes of the pancreas, plays an important part in breaking down starch in the small intestine, and that the rate of digestion of a starch meal can be estimated by the rise in blood sugar that follows.

In the test, patients drink a solution of a specially prepared starch. The blood is tested for sugar content during the next three hours. The greatest rise in blood sugar is compared to that following consumption of an equivalent amount of sugar (glucose).

In normal persons, the California doctors found, the mean rise in blood sugar after glucose was 14% greater than after starch.

In 23 patients with chronic disease of the pancreas, however, the mean maximum rise in blood sugar was 234% higher after glucose than after starch.

In five patients suffering from diffuse cancer of the pancreas, the difference was even more pronounced. The rise in blood sugar averaged 342% higher after glucose than after starch.

In 10 patients with suspected disease of the pancreas, the rise was 112% higher after glucose than starch but only five of these patients had a difference of over 100%.

In two patients after surgical removal of most of the pancreas, which resulted in apparent recovery of the patients, the starch tolerance test was normal several months after the operation.

The pancreas, sometimes called the sweetbread, contains the islands of Langerhans which produce insulin and which are affected in diabetes, failing to produce enough insulin for proper handling of sugar. But the presence of diabetes did not interfere with the results of the starch tolerance test for other disease of the pancreas, such as cancer.

The new test, the California doctors report, compares favorably with several more complicated tests of pancreas function.

Science News Letter, April 17, 1954

MEDICINE

Polio Vaccine Safe

➤ PARENTS WHO want polio vaccine trials to be put on in their community, with the chance of their children getting polio protection this season, may defeat their own wish by raising too much excitement about the vaccine safety question.

The U. S. Public Health Service and the National Foundation for Infantile Paralysis have declared that only safe vaccine, made from definitely killed viruses, will be used.

If tests by the Public Health Service's National Institutes of Health, vaccine manufacturers and Dr. Jonas Salk of Pittsburgh show live virus in a particular batch of vaccine, that batch will be discarded and not used.

However, time for vaccinating is growing short. The vaccine cannot be properly tried as a polio preventive unless given before the polio epidemic season starts. Once the season starts, it would be hard to know whether a child got extra polio-fighting antibodies in his blood from the vaccine, or from small amounts of polio virus that got into his body because there was so much of it in his community. And, of course, unless the vaccine had been given in time to call up plenty of antibodies, it might not do any good in protecting the child.

In planning the vaccine trials, it has been decided that if an epidemic starts in an area selected for vaccinating, the trials may be called off by the State Health Officer on the basis of the situation at the time.

If many parents get worried about the vaccine's safety, the time needed to reassure them may cause enough delay to put their area into the no-trials class because polio had already gotten into an epidemic or near-epidemic stage.

Difficulties in transferring Dr. Salk's laboratory scale vaccine production methods to large scale manufacturing have already delayed the start of the trials by at least two months. Originally scheduled to start early in February, they are now expected to start about mid-April.

Questions to be answered are:

Will the vaccine protect children?

Can the trials this season be staged in a way to show its value?

Dr. Salk, who developed the vaccine, and the National Foundation seem confident the answer to the first question is yes. On the second, the unforeseeable delays may be making them wonder.

Science News Letter, April 17, 1954

PSYCHOLOGY

Girls "See" the Average At a Glance, No Figuring

➤ IT IS possible to look at pins appearing one after another along a plain background and tell with "considerable accuracy" where the average (mean) pin was located. It is also possible to give a reasonably accurate estimate of the middle location, what statisticians call the median.

This ability of the mind, called by the discoverers "subjective statistics," was reported to the Eastern Psychological Association meeting in New York by Drs. H. H. Corbin, James L. Morey and Mrs. Barbara V. Parshley of Mount Holyoke College, University of Utah, and Hanover, N. H., respectively.

It was found in experiments with ten college girls. Their judgments of the median are quite regular, it was found, and lie between the actual median and the actual mean. Judgments of the mean are also regular and lie considerably closer to the actual mean than to the actual median.

Science News Letter, April 17, 1954

Questions

ASTROPHYSICS—What is the source of the yellow corona line in the sun? p. 245.

□ □ □

HERPETOLOGY—How does a rattle snake's rattle indicate temperature? p. 247.

□ □ □

MEDICINE—How do scientists now know that cancer cells grown in a test tube are still human? p. 245.

□ □ □

NUTRITION—Why should doctors first try themselves diets they prescribe for patients? p. 249.

□ □ □

TECHNOLOGY—What industrial uses are now being made of bagasse? p. 250.

□ □ □

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PHOTOGRAPHIC ANTI-DUST solution for darkrooms can be added in small quantities to final film rinse water. The solution is designed to rid the film of static electricity that collects annoying dust.

Science News Letter, April 17, 1954

NYLON WASHING bag protects lingerie and other fine garments from washing machine tears and tangles. Closed with a drawstring, the strong bag also can be used when washing hosiery, blouses, handkerchiefs, sweaters, doilies and curtains.

Science News Letter, April 17, 1954

WHEEL LIFTER takes the grunt and groan out of positioning the spare tire on the wheel hub when the motorist is fixing a flat. The hand-held device consists of two prongs that are inserted through bolt holes in the wheel rim, and in the bottom bolt holes in the wheel hub. When lifted, the device levers the wheel into place easily.

Science News Letter, April 17, 1954

CHEMICAL WEEDER, when first applied, kills weed seeds, then undergoes a rapid chemical change to become a highly effective fertilizer. The chemical, calcium cyanamide, is said to supply soil-sweetening lime and plant-feeding nitrogen during the entire growing season.

Science News Letter, April 17, 1954

DRIVEWAY MARKERS, consisting of a pair of barrel-shaped reflectorized units, are placed at the curb on each side of the driveway, as shown in the photograph. They clearly define the limits of the driveway day and night, helping to eliminate short-cutting and to reduce damage to tires, wheels and lawns. The units can be screwed to any length of pipe. A special set can be obtained already mounted on bases that give an eight-inch-tall overall height.

Science News Letter, April 17, 1954

LUNCH BOX LINER, made of a white, washable plastic, has two compartments with snug fitting lids for juicy foods and one compartment for solid foods. It fits standard-sized lunch pails.

Science News Letter, April 17, 1954

RAINY DAY OUTFIT for men features a brown plastic ensemble of raincoat with cape back, a hat protector and leggings. The leggings, designed to keep spring showers from soaking trousers, slip on easily and are held up at the top by a loop over the belt.

Science News Letter, April 17, 1954

GARDEN SPRINKLING control can be set to turn on a sprinkler system at any time of day or night and to shut it off later. A special device prevents the sprinkler from going into operation on rainy days or when the earth is properly moist.

Science News Letter, April 17, 1954

Do You Know?

Some of the purest *magnesium* in the world is obtained in Canada.

Widespread *coffee tree* damage during the July frosts last year cost Brazil an estimated $173,938,000.

Crack teams of fire-fighting Indians, ready to fly at a moment's notice to a threatened area, are being used increasingly to fight *forest fires* throughout the western states.

A five-seater businessman's *airplane* is being developed that can take off on fields less than 100 feet long and fly at speeds from 25 to 165 miles an hour.

Within a radius of 215 miles of Brussels, there are 72,000,000 inhabitants—equal to nearly half of the U. S. *population*.

The total *eclipse* of the sun on June 30 will be followed by two partial eclipses of the sun and a partial eclipse of the moon.

It is estimated that *electrical wiring* for a new house represents about five percent of the total cost.

Estimated *fire losses* in the U. S. during February amounted to $78,928,000.

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